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AFFDL-TR-66-43  
PART XIX

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**AIRCRAFT GROUND-FLOTATION INVESTIGATION**  
**PART XIX. DATA REPORT ON LIGHT-LOAD TRAFFIC TESTS**

*A. RUTLEDGE and G. HAMMITT, II*

**U. S. ARMY ENGINEER WATERWAYS EXPERIMENT STATION**

**TECHNICAL REPORT AFFDL-TR-66-43, PART XIX**

**OCTOBER 1966**

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AFFDL-TR-66-43  
PART XIX

## **AIRCRAFT GROUND-FLOTATION INVESTIGATION**

### **PART XIX. DATA REPORT ON LIGHT-LOAD TRAFFIC TESTS**

*A. RUTLEDGE and G. HAMMITT, II*

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## FOREWORD

The investigation described herein constitutes one phase of studies conducted during 1964 and 1965 at the U. S. Army Engineer Waterways Experiment Station (WES) under U. S. Air Force Project No. 410-A, MIPR No. AS-4-177, "Development of Landing Gear Design Criteria for the CX-HLS Aircraft." (The CX-HLS is now designated C-5A.) This program was sponsored and directed by the Landing Gear Group, Air Force Flight Dynamics Laboratory, Research and Technology Division, Mr. R. J. Parker, Project Engineer.

These tests were conducted by personnel of the WES Flexible Pavement Branch, Soils Division, and Army Mobility Research Branch, Mobility and Environmental Division, under the general supervision of Messrs. W. J. Turnbull, A. A. Maxwell, and R. G. Ahlvin of the Soils Division and W. G. Shockley, S. J. Knight, and D. R. Freitag of the Mobility and Environmental Division. The tests were under the direct supervision of Mr. D. N. Brown. Other personnel actively engaged in this study were Messrs. C. D. Burns, D. M. Ladd, A. H. Rutledge, H. H. Ulery, Jr., W. J. Hill, Jr., and G. M. Hammitt II of the Soils Division, and J. L. Smith of the Mobility and Environmental Division. This report was prepared by Messrs. Rutledge and Hammitt.

Directors of WES during the conduct of this investigation and preparation of this report were Col. Alex G. Sutton, Jr., CE, and Col. John R. Oswalt, Jr., CE. Technical Director was Mr. J. B. Tiffany.

Publication of this technical documentary report does not constitute Air Force approval of the report's findings or conclusions. It is published only for the exchange and stimulation of ideas.



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## ABSTRACT

This data report describes work undertaken as part of an overall program to develop ground-flotation criteria for the C-5A aircraft. Eight unsurfaced test lanes having low CBR values were constructed in soil test cars with one item in each lane. Traffic was applied to the eight lanes using a single-wheel assembly with a 9.00-14, 8-ply tire, buffed smooth. Five lanes were trafficked with a 1000-lb load on a tire with inflation pressures ranging from 10 to 40 psi, and three lanes were trafficked with a 2000-lb load on a tire with inflation pressures ranging from 40 to 80 psi.

The information reported herein includes a description of the test lanes, characteristics and print dimensions of the load assembly tire, and data collected on soil strengths, surface deformation and deflections, and drawbar pull. The traffic-coverage level at which each item was considered failed is also given.

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## SUMMARY

Tests included in this report are one phase of a comprehensive research program to develop ground-flotation criteria for heavy cargo-type aircraft. The eight tests reported herein made use of eight test lanes and involved soil strengths of approximately 1 and 2 CBR, two loads, and various inflation pressures. All lanes were unsurfaced.

Traffic was applied to the eight lanes using a single-wheel assembly with a 9.00-14, 8-ply tire buffed smooth. Five lanes were trafficked with a 1000-lb loading on a tire with inflation pressures ranging from 10 to 40 psi, and three lanes were trafficked with a 2000-lb load on a tire with inflation pressures ranging from 40 to 80 psi.

Data were recorded throughout testing to give a behavior history of each item. Basic performance data are summarized in the following paragraphs.

### Lane 1

Lane 1 was considered failed due to shear displacement and upheaval at 200 coverages. The rated CBR of the lane was 1.4.

### Lane 2

Lane 2 was considered failed due to excessive rutting and roughness at 24 coverages. The rated CBR of the lane was 1.0.

### Lane 3

Lane 3 was considered failed due to excessive rutting at 18 coverages. The rated CBR of the lane was 1.1.

Lane 4

Lane 4 was considered failed due to excessive rutting at 50 coverages. The rated CBR of the lane was 1.2.

Lane 5

Lane 5 was considered failed at 38 coverages due to excessive rutting. The rated CBR of the lane was 2.3.

Lane 6

Lane 6 was considered failed due to excessive rutting at 50 coverages. The rated CBR of the lane was 2.6.

Lane 7

Lane 7 was considered failed due to excessive rutting at 44 coverages. The rated CBR of the lane was 2.5.

Lane 8

Lane 8 was considered failed due to excessive rutting and roughness at 178 coverages. The rated CBR was 1.1.

## AIRCRAFT GROUND-FLOTATION INVESTIGATION

### PART XIX DATA REPORT ON LIGHT-LOAD TRAFFIC TESTS

#### SECTION I: INTRODUCTION

The investigation reported herein is one phase of a comprehensive research program being conducted at the U. S. Army Engineer Waterways Experiment Station (WES), Vicksburg, Miss., as part of U. S. Air Force Project No. 410-A, MIPR No. AS-4-177, to develop ground-flotation criteria for the C-5A, a heavy cargo-type aircraft. Specifically, the tests reported herein are part of a series of tests to improve existing ground-flotation criteria in the light-load, low-tire-pressure range and study the possibilities of applying model scaling principles to reduce the quantity of full-scale field tests required to develop ground-flotation criteria.

Prosecution of this investigation consisted of constructing eight similar lanes and subjecting them to two test loads with a single-wheel assembly with various inflation pressures.

This report presents a description of the test section and load vehicle, and gives results of traffic. Equipment used, types of data and method of recording them, and general test criteria are explained and illustrated herein. Analysis of data will be included in Part I of this report.

## SECTION II: DESCRIPTION OF TEST LANE AND LOAD VEHICLE

### Description of Test Lane

The test lanes were enclosed within a roofed area in order to allow control of the subgrade CBR (California Bearing Ratio). The test lanes were prepared in movable cars constructed of steel plate (figure 4) with a cross-section shape as shown in figure 1. These cars and their associated loading and electronic monitoring and measuring equipment were developed in conjunction with Army Ground Mobility Research being conducted at the WES. Complete description of the facility is not pertinent to this report, but can be found in WES Technical Report No. 3-666.\* Two cars, each 27 ft long with removable end gates, were joined end to end before soil placement was begun to make a test unit. The soil, placed in compacted lifts, was a heavy clay soil (buckshot; classified as CH according to the Unified Soil Classification System, MIL-STD-619). Gradation and classification data for the subgrade material are given in Part I.

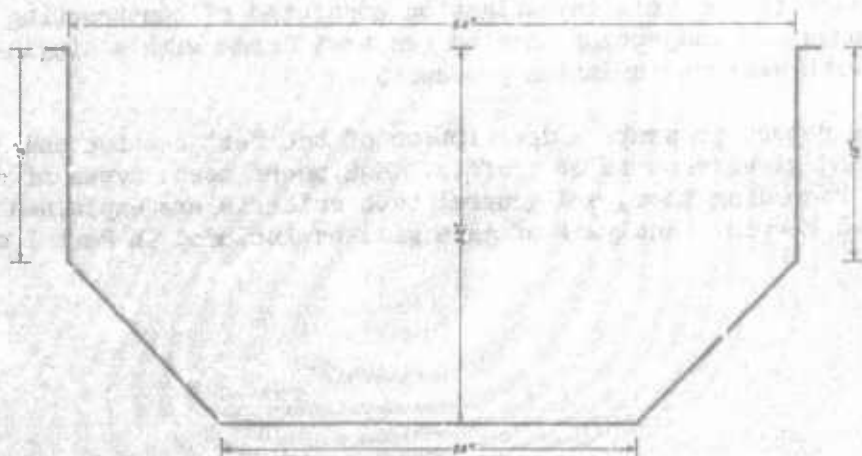


Figure 1. Cross section of soil car

Two different subgrade strengths were obtained in the lanes by controlling water content and compaction effort. All items were unsurfaced.

### Load Vehicle

Figure 4 shows the operations area of the test facility. The test carriage is shown in figure 5. The test carriage is supported by

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\* U. S. Army Engineer Waterways Experiment Station, CE, Performance of Soils Under Tire Loads, by J. L. McRae, C. J. Powell, and R. D. Wismer. Technical Report 3-666, Report 1 (January 1965).



rubber-tired rollers on a pair of accurately aligned and graded overhead rails which are, in turn, suspended from cantilever columns and crossarms in a manner very similar to a typical monorail system. The carriage is towed by an endless steel cable which is fastened, fore and aft, to the carriage, passes over pulleys at the ends of the track system, and is driven by sheaves mounted on a platform above the overhead rails. The speed of the towing cable can be varied continuously from 0 to about 26 ft per sec, and the cable pulleys can be shifted transversely across the width of the soil cars, along with the test carriage, so that the traffic can be applied along any line within the cars.

Load can be applied to the wheel by the addition of dead weights or by pneumatic cylinders mounted between the upper and lower frames of the carriage. The load was applied pneumatically during the tests reported herein, with the exception of dead load used in calibration procedures. For test lanes 1 through 4 and 8, the wheel load was 1000 lb and tire pressures ranged from 10 to 40 psi. For test lanes 5 through 7, the load was 2000 lb and pressures ranged from 40 to 80 psi. A single-wheel load assembly was used on all lanes.



### SECTION III: APPLICATION OF TRAFFIC, FAILURE CRITERIA, AND DATA COLLECTED

#### Application of Traffic

The load vehicle was operated to produce uniform traffic coverage on the center portion of lane 1. Figure 2 shows the general method of applying traffic on lane 1. The dashed lines in the figure represent the center of

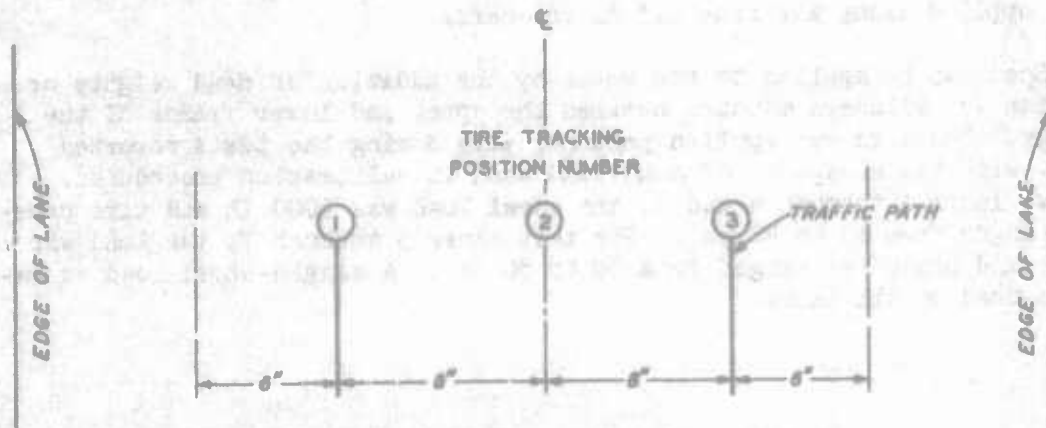


Figure 2. Traffic application pattern

tire paths over which 1 pass was applied after each 20 coverages within the main portion of the traffic lane. This infrequent additional traffic was necessary to limit upheaval of soil outside the lane that resulted from traffic within the lane.

The traffic pattern was changed after trafficking lane 1 to that shown in figure 17 for the remaining seven tests. The revised pattern represents a normal statistical distribution of traffic about the lane center line. It should be noted that at any given point within the pattern the coverage level is greatest on lane center line and decreases as the distance from the lane center line increases. In both of the traffic patterns described herein, a forward run and a backward run were made in the same path before moving the wheel laterally to the next path in sequence.

#### Failure Criteria

Failure criteria used in this investigation and descriptive terms used in presentation and discussion of data in all parts in this report are presented in Part I.

### Data Collected

An oscillograph capable of handling 36 channels of data was utilized for gathering data while the test carriage was in motion. The data gathered included rolling resistance (drawbar pull), wheel load, carriage acceleration, carriage position, wheel revolutions, and wheel sinkage (vertical position of the wheel relative to an arbitrary horizontal datum plane). Timing marks on the oscillograph allow the evaluation of data in any of the above data areas with respect to time. A general outline of types of data collected is given in the following paragraphs.

### CBR, cone index, water content, and dry density

Cone index is the measurement normally used for strength determinations in the ground mobility facility in which the tests reported herein were conducted, whereas CBR is the strength measurement used in all ground-flotation tests. In the tests reported herein, both cone index and CBR values were obtained for each lane. A correlation of these two measurements was therefore possible. Figure 3 shows the relation between CBR and cone index for this study.

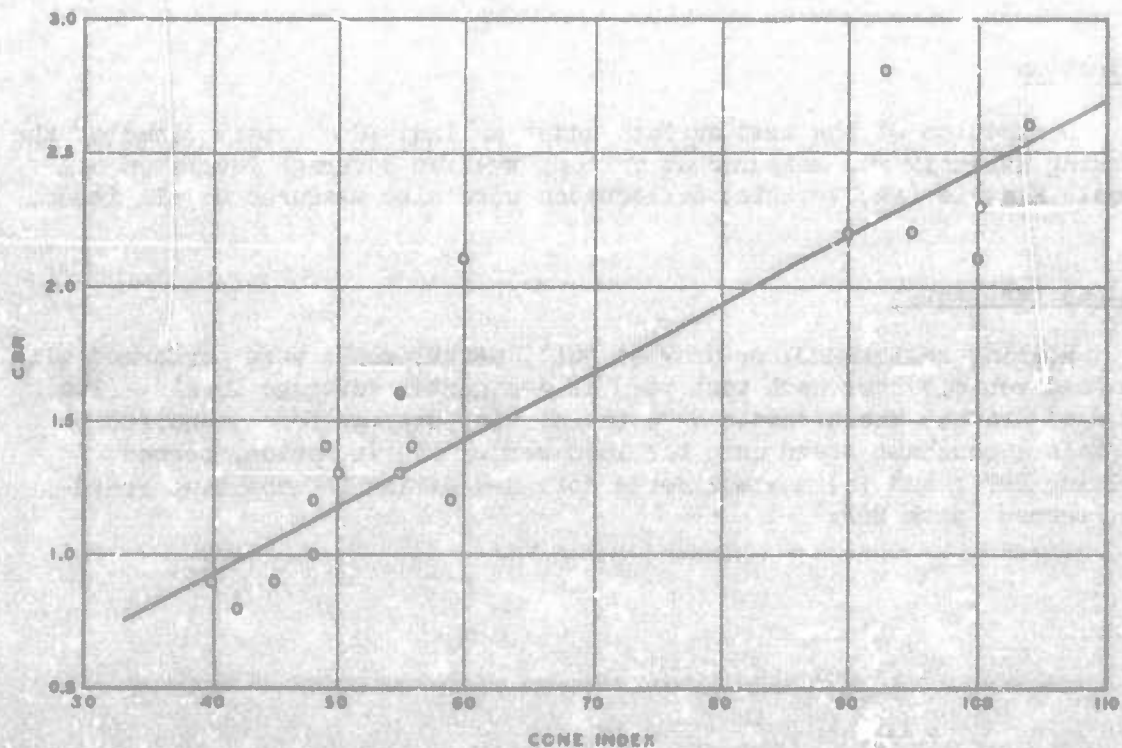


Figure 3. Cone index versus CBR

CBR, cone index, water content, and dry density of the subgrade were measured for each test item prior to application of traffic, at intermediate coverage levels, and at failure. After traffic was concluded on an item, a measure of subgrade strength termed "rated CBR" was determined. Rated CBR is generally the average CBR value obtained from all the determinations made in the top 12 in. of soil during the test life of an item. In certain instances, extreme or irregular values may be ignored if the analyst decides that they are not properly representative.

#### Surface roughness, or differential deformation

Surface roughness, or differential deformation, measurements were made using a 6-ft straightedge at various traffic-coverage levels on all items. Rut depths were also measured for all items.

#### Deformations

Deformations, defined as permanent cumulative surface changes in cross section or profile of an item, were charted by means of instrumentation at pertinent traffic-coverage levels.

#### Deflection

Deflection of the test surface under an individual static load of the tracking assembly was measured at various traffic-coverage levels on all items. Elastic (recoverable) deflections were also measured on all items.

#### Rolling resistance

Rolling resistance, or drawbar pull, measurements were performed with the load vehicle over each test item at designated coverage levels. Two types of drawbar measurements were taken: (a) average force required to maintain a constant speed once the load vehicle is in motion, termed "rolling DBP"; and (b) maximum force obtained during the constant speed run, termed "peak DBP."

#### SECTION IV: BEHAVIOR OF ITEMS UNDER TRAFFIC AND TEST RESULTS

A characteristic behavior common to all tests was general subsidence within the lane accompanied by lateral shear displacement. This accounts for the upheaval of material outside the traffic lane, as seen in each of the cross sections and photographs. Figure 6 shows a view that is typical of all lanes prior to traffic.

##### Lane 1

##### Behavior of items under traffic

Due to the limited width of the lane (three tire prints wide), the midportion of the lane experienced less subsidence than did the two outer tire paths. An uneven profile, accounting for considerable roughness, developed at higher coverage levels. The lane was considered failed due to excessive upheaval at 200 coverages (figures 7 and 8). The rated CBR was 1.4.

##### Test results

Table 1 summarizes the results of trafficking and shows drawbar pull values. Table 2 shows tire data.

The following information was obtained from traffic tests on lane 1.

- a. Roughness. The maximum center-line deformation was 1.88 in. at failure (table 1). The maximum transverse departure from a 6-ft straightedge was 5.7 in.
- b. Deformation. Figures 18 and 19 show average cross-section and permanent profile deformations, respectively, at failure.
- c. Deflections. Elastic subgrade deflection was 0.21 in. at 200 coverages.
- d. Rolling resistance. Drawbar pull values at various coverage levels are shown in table 1.

##### Lane 8

##### Behavior of items under traffic

Since the procedures for trafficking the lanes were changed after



trafficking lane 1, a rerun of lane 1 was desired. Therefore, lane 8 is a rerun of lane 1.

Lane 8 was declared failed at 178 coverages due to excessive rutting and roughness. The rated CBR was 1.1. Figure 9 shows lane 8 at failure.

### Test results

Table 1 summarizes the results of trafficking and shows drawbar pull values. Table 2 shows tire data.

The following information was obtained from traffic tests on lane 8.

- a. Roughness. The maximum center-line deformation was 2.15 in. at failure (table 1). The maximum transverse departure from a 6-ft straightedge was 3.5 in.
- b. Deformation. Figures 18 and 19 show average cross-section and permanent profile deformations, respectively, at failure. However, for the profile along the lane center line figure 19 shows a plot of relative elevation since no original ground shots were taken prior to traffic. These plots do not reflect the true magnitude of surface deformation, but do attest to the uneven surface condition.
- c. Deflections. The elastic soil deflection measured 0.30 in. at failure.
- d. Rolling resistance. Average and peak drawbar pull values were determined at various coverage levels, as shown in table 1.

### Lane 2

#### Behavior of items under traffic

With the increase in tire pressure to 20 psi, more severe deformation resulted. With the application of traffic, soil began to adhere to the tire, making it necessary to remove excessive amounts of clay in order to continue testing. Lane 2 was declared failed at 24 coverages excessive rutting and roughness (figure 10). The rated CBR was

### Test results

Table 1 summarizes the results of trafficking and shows drawbar pull values. Table 2 shows tire data.

The following information was obtained from traffic tests on lane 2.

- a. Roughness. The maximum center-line deformation was 2.43 in. at failure (table 1). The maximum transverse departure from a 6-ft straightedge was 4.5 in. and diagonal departure was 3.0 in.
- b. Deformation. Figures 20 and 21 show average cross-section and permanent profile deformations at failure.
- c. Deflections. The elastic soil deflection measured 0.47 in. at failure.
- d. Rolling resistance. Average and peak drawbar pull values were determined at various coverage levels, as shown in table 1.

### Lane 3

#### Behavior of items under traffic

Traffic was continued to 24 coverages (figure 11), though failure was declared at 18 coverages due to excessive rutting. The load wheel required cleaning after each two passes following 12 coverages due to soil adhering to the tire as in lane 2. Figure 12 shows a load wheel with an accumulation of soil during testing. The rated CBR was 1.1.

#### Test results

Table 1 summarizes the results of trafficking and shows drawbar pull values. Table 2 shows tire data. The following information was obtained from traffic tests on lane 3.

- a. Roughness. The maximum center-line deformation was 2.36 in. at failure (table 1). The maximum transverse and diagonal departures from a 6-ft straightedge were 5.0 and 4.0 in., respectively, at 24 coverages (six postfailure coverages).
- b. Deformation. Figures 20 and 21 show average cross-section and permanent profile deformations at 24 coverages (six postfailure coverages).
- c. Deflections. The elastic soil deflection was 0.60 in. at 24 coverages (six postfailure coverages).
- d. Rolling resistance. Average and peak drawbar pull values were determined, as shown in table 1.



#### Lane 4

##### Behavior of items under traffic

The tire inflation pressure was 40 psi and the rated CBR was 1.2 for lane 4. After 14 coverages, soil began to adhere to the tire (figure 12) and had to be removed periodically. The lane was declared failed at 50 coverages due to excessive rutting (figure 13).

##### Test results

Table 1 summarizes the results of trafficking and shows drawbar pull values. Table 2 shows tire data. The following information was obtained from traffic tests on lane 4.

- a. Roughness. The maximum center-line deformation was 2.44 in. at failure (table 1). The maximum transverse and diagonal departures from a 6-ft straightedge were 5.0 and 4.3 in., respectively.
- b. Deformation. Figures 22 and 23 show average cross-section and permanent profile deformations at failure.
- c. Deflections. The elastic soil deflection was 0.38 in. at failure.
- d. Rolling resistance. Average and peak drawbar pull values were determined at various coverage levels, as shown in table 1.

#### Lane 5

##### Behavior of items under traffic

A 2000-lb load and 40-psi inflation pressure were used on a soil with a 2.3 rated CBR in lane 5. The lane was declared failed at 38 coverages due to excessive rutting (figure 14).

##### Test results

Table 1 summarizes the results of trafficking and shows drawbar pull values. Table 2 shows tire data. The following information was obtained from traffic tests on lane 5.

- a. Roughness. The maximum center-line deformation was 3.32 in. at failure (table 1). The maximum transverse and diagonal departures from a 6-ft straightedge were 8.3 and 4.8 in., respectively.
- b. Deformation. Figures 22 and 23 show average cross-section and

permanent profile deformations at failure.

- c. Deflections. The elastic soil deflection was 0.38 in. at failure.
- d. Rolling resistance. Average and peak drawbar pull values were determined at various coverage levels, as shown in table 1.

#### Lane 6

##### Behavior of items under traffic

A 2000-lb load and 60-psi inflation pressure were used on a soil with a 2.6 rated CBR in lane 6. The lane was declared failed at 50 coverages due to excessive rutting (figure 15). No unusual behavior occurred.

##### Test results

Table 1 summarizes the results of trafficking and shows drawbar pull values. Table 2 shows tire data. The following information was obtained from traffic tests on lane 6.

- a. Roughness. The maximum center-line deformation was 2.65 in. at failure (table 1). The maximum transverse and diagonal departures from a 6-ft straightedge were 6.0 and 3.5 in., respectively.
- b. Deformation. Figures 24 and 25 show average cross-section and permanent profile deformations at failure.
- c. Deflections. The elastic soil deflection was 0.51 in. at failure.
- d. Rolling resistance. Average and peak drawbar pull values were determined at various coverage levels, as shown in table 1.

#### Lane 7

##### Behavior of items under traffic

The last of the tests having a 2000-lb load was conducted on lane 7 with an inflation pressure of 80 psi and a soil strength rated 2.5 CBR. No unusual conditions developed during the test. The lane was considered failed at 44 coverages due to excessive rutting (figure 16).

## Test results

Table 1 summarizes the results of trafficking and shows drawbar pull values. Table 2 shows tire data. The following information was obtained from traffic tests on lane 7.

- a. Roughness. The maximum center-line deformation was 2.51 in. at failure (table 1). The maximum transverse and diagonal departures from a 6-ft straightedge were 7.0 and 3.8 in., respectively.
- b. Deformation. Figures 24 and 25 show average cross-section and permanent profile deformations at failure.
- c. Deflections. The elastic soil deflection was 0.73 in. at failure.
- d. Rolling resistance. Average and peak drawbar pull values were determined at various coverage levels, as shown in table 1.



## SECTION V: PRINCIPAL FINDINGS

From the foregoing discussion, the principal findings relating test load, wheel assembly, tire inflation pressure, subgrade CBR, and traffic coverages are as follows:

<u>Load Wheel Assembly</u>	<u>Lane No.*</u>	<u>Tire Pressure, psi</u>	<u>Rated Subgrade CBR</u>	<u>Coverages at Failure</u>
1000-lb load; single-wheel assembly; 9.00-14, 8-ply tire	1	10	1.4	200
	8	10	1.1	178
	2	20	1.0	24
	3	30	1.1	18
	4	40	1.2	50
2000-lb load; single-wheel assembly; 9.00-14, 8-ply tire	5	40	2.3	38
	6	60	2.6	50
	7	80	2.5	44

\* All lanes were unsurfaced.

TABLE 1  
SUMMARY OF TRAFFIC DATA, LANES 1-8

Lane	Cover- ages	Core Index	Rated CBR	Drawbar Pull			Single- Pass Permanent Deforma- tion (in.)	Elastic Soil Deflec- tion (in.)	Deformation Along Center Line (in.)		Departures from 6-ft Straightedge (in.)				Remarks
				Wheel Load	Roll- ing (lb)	Peak (lb)					Trans- verse		Diagonal		
											Avg	Max	Avg	Max	
1	1	59	1.4	4.5	45	80									Failed at 200 coverages due to shear displacement and upheaval
	2				51	100	0.03	0.00	0.02	0.05					
	4				56	95	--	--	0.02	0.06					
	6				60	105	--	--	0.02	0.05					
	12				63	105	--	--	0.09	0.20					
	18				68	95	--	--	0.15	0.27					
	24				70	110	0.12	0.12	0.22	0.33					
	48				79	125	--	--	0.41	0.53					
	100				83	135	--	--	0.89	1.05					
200			8.2	87	245	--	0.21	1.53	1.88	5.2	5.7				
2	1	43	1.0	11.0	110	135	0.37	0.37	0.46	0.55					Failed at 24 coverages
	2				115	160	--	--	0.74	0.90					
	6			14.0	140	185	--	--	1.13	1.30					
	24			18.0	180	260	0.69	0.47	1.28	2.43	3.3	4.1	2.0	3.0	
3	1	47	1.1	13.0	130	170	0.54	0.40	0.53	0.68					Failed at 18 coverages
	2				128	170	--	--	0.80	0.95					
	6			17.0	168	225	--	--	1.17	1.38					
	14				--	--	--	--	1.62	1.79	2.5	3.0			
	18				--	--	--	--	2.01	2.37					
	24			19.0	193	255	0.92	0.60	2.31	2.82	4.0	5.0	3.6	4.0	
4	1	51	1.2	14.5	145	190			0.61	0.68					Failed at 50 coverages
	2				142	190	0.70	0.41	0.93	1.00					
	6			16.8	168	210	--	--	1.20	1.29					
	24			19.0	190	285	--	--	1.50	1.60	3.0	3.3			
	48			19.5	195	295	0.45	0.50	1.95	2.35	4.2	5.0			
	50						0.20	0.38	2.30	2.44	4.9	5.0	4.1	4.3	
5	1	95	2.3	9.0	180	235			0.37	0.52					Failed at 38 coverages
	2				182	260	0.51	0.15	0.65	0.95					
	6			11.5	230	295	--	--	1.03	1.40					
	24			13.3	240	335	0.38	0.51	1.51	2.00	3.8	4.0			
	38			12.5	240	365	0.23	0.38	2.43	3.32	6.3	8.3	4.0	4.2	
6	1	107	2.6	9.0	180	235			0.47	0.57					Failed at 50 coverages
	2			9.5	190	265	0.49	0.37	0.72	0.96					
	6			12.4	248	305	--	--	1.02	1.27					
	24			14.5	290	385	0.33	0.43	1.22	1.55					
	48			15.8	315	400	--	--	2.03	2.30					
	50				300	295	0.29	0.51	2.29	2.65	5.5	6.0	3.2	3.5	
7	1	103	2.5	11.5	230	300	0.56	0.44	0.45	0.69					Failed at 44 coverages
	5			13.5	270	380	--	--	0.92	1.16					
	24			15.3	307	455	0.44	0.54	0.95	1.16	3.1	3.5	2.7	3.3	
	44			16.0	320	430	0.28	0.73	2.16	2.52	6.8	7.0	3.1	3.8	
8	1	47	1.1	4.5	45	85									Failed at 178 coverages
	2				48	85	0.01	0.01	0.05	0.11					
	5				55	80	--	--	0.12	0.15					
	24				85	110	0.09	0.00	0.15	0.21					
	48				88	160	0.50	0.22	0.47	0.47	1.3	1.4	1.3	1.4	
	100			10.0	100	175	0.64	0.20	0.86	0.86	1.7	1.9	1.6	1.6	
	178						0.00	0.30	1.05	2.15	1.1	3.5	3.6	3.5	

Note: The wheel load for lanes 1-4 and 8 was 1000 lb. For lanes 5-7, the wheel load was 2000 lb.

TABLE 2  
TIRE DATA

<u>Lane</u>	<u>Gross Load (lb)</u>	<u>Tire Inflation Pressure (psi)</u>	<u>Tire Deflection (%)</u>	<u>Tire Diameter Unloaded (in.)</u>	<u>Loaded Rolling Circumference (ft)</u>	<u>Tire Contact Area (sq in.)</u>	<u>Tire Contact Pressure (psi)</u>
1	1000	10	36.2	26.59	6.42	65.16	15.35
2	1000	20	23.4	--	6.65	40.14	24.91
3	1000	30	18.6	26.97	6.79	28.55	35.03
4	1000	40	16.3	27.15	6.89	22.32	44.80
5	2000	40	26.5	27.15	6.71	43.51	45.97
6	2000	60	20.5	27.37	6.88	31.72	63.05
7	2000	80	17.1	27.53	7.00	24.65	81.14
8	1000	10	36.2	26.59	6.42	65.16	15.35





3445-284

Figure 4. Operations area of test facility



Figure 5. Test carriage over the soil test car

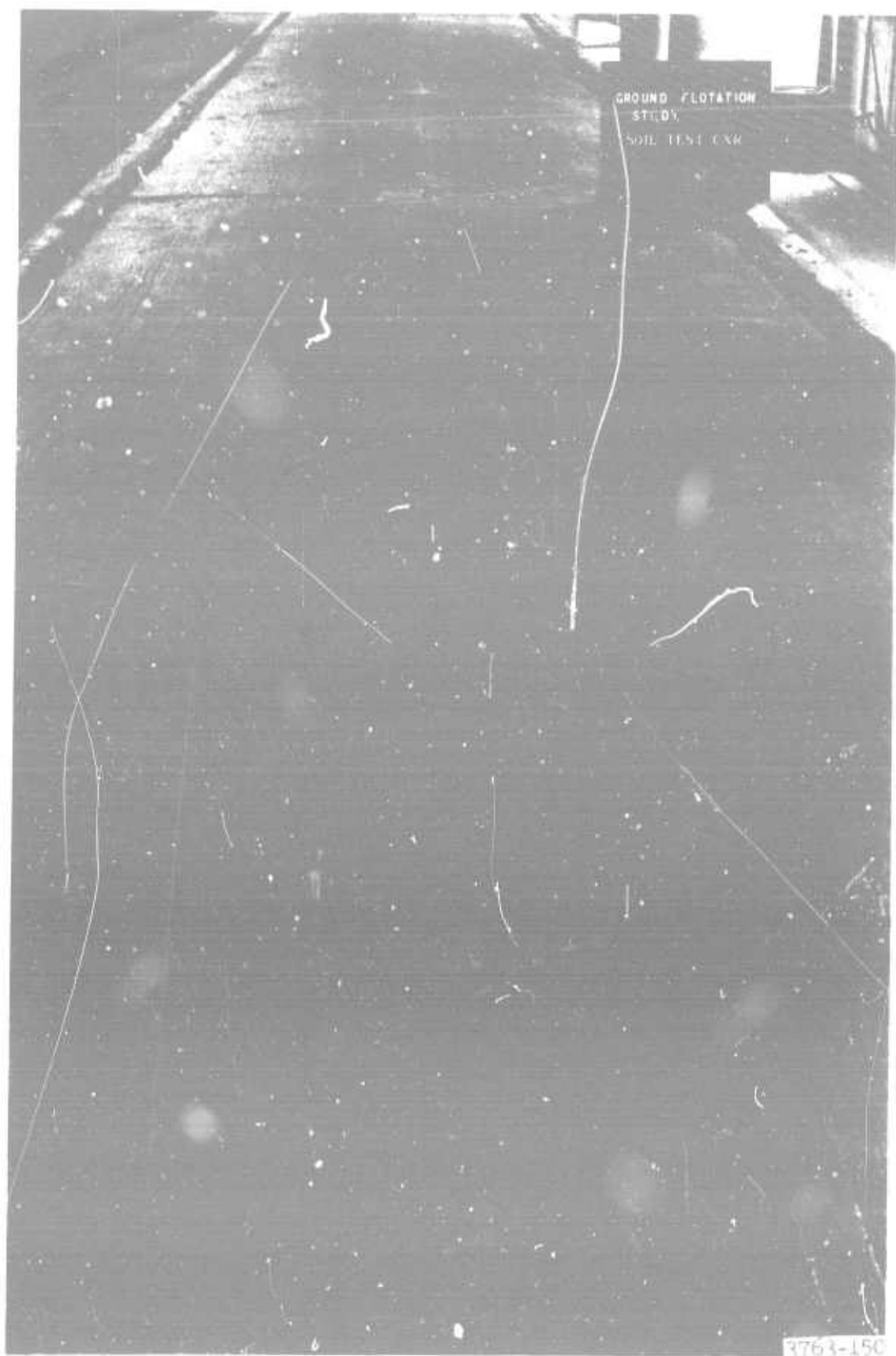
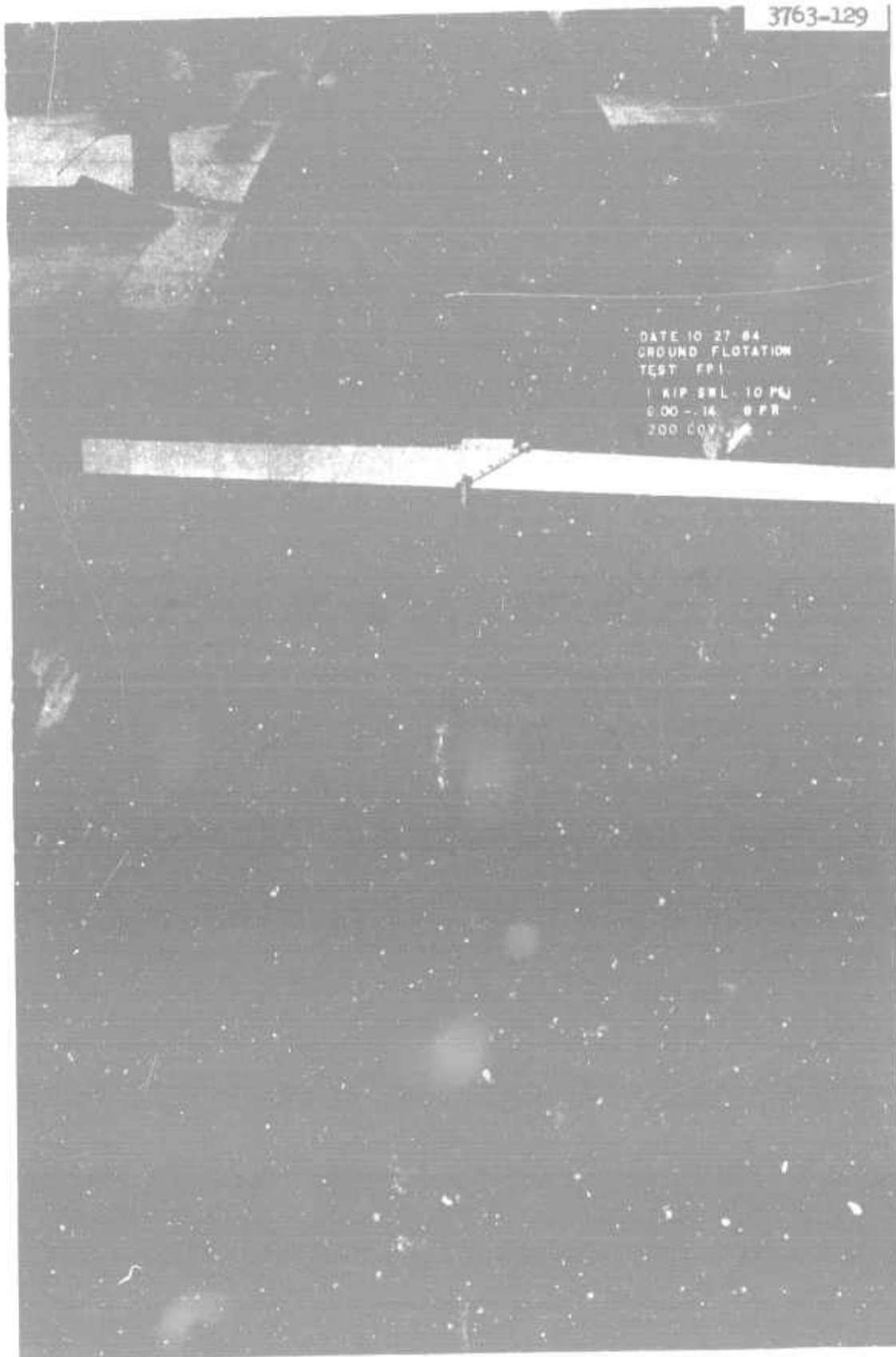


Figure 6. Prepared soil car prior to traffic



3763-129

DATE 10 27 84  
GROUND FLOTATION  
TEST FPI  
1 KIP SRL 10 PSI  
0.00 - 14.8 PR  
200 COV

Figure 7. Lane 1 at 200 coverages (failure)

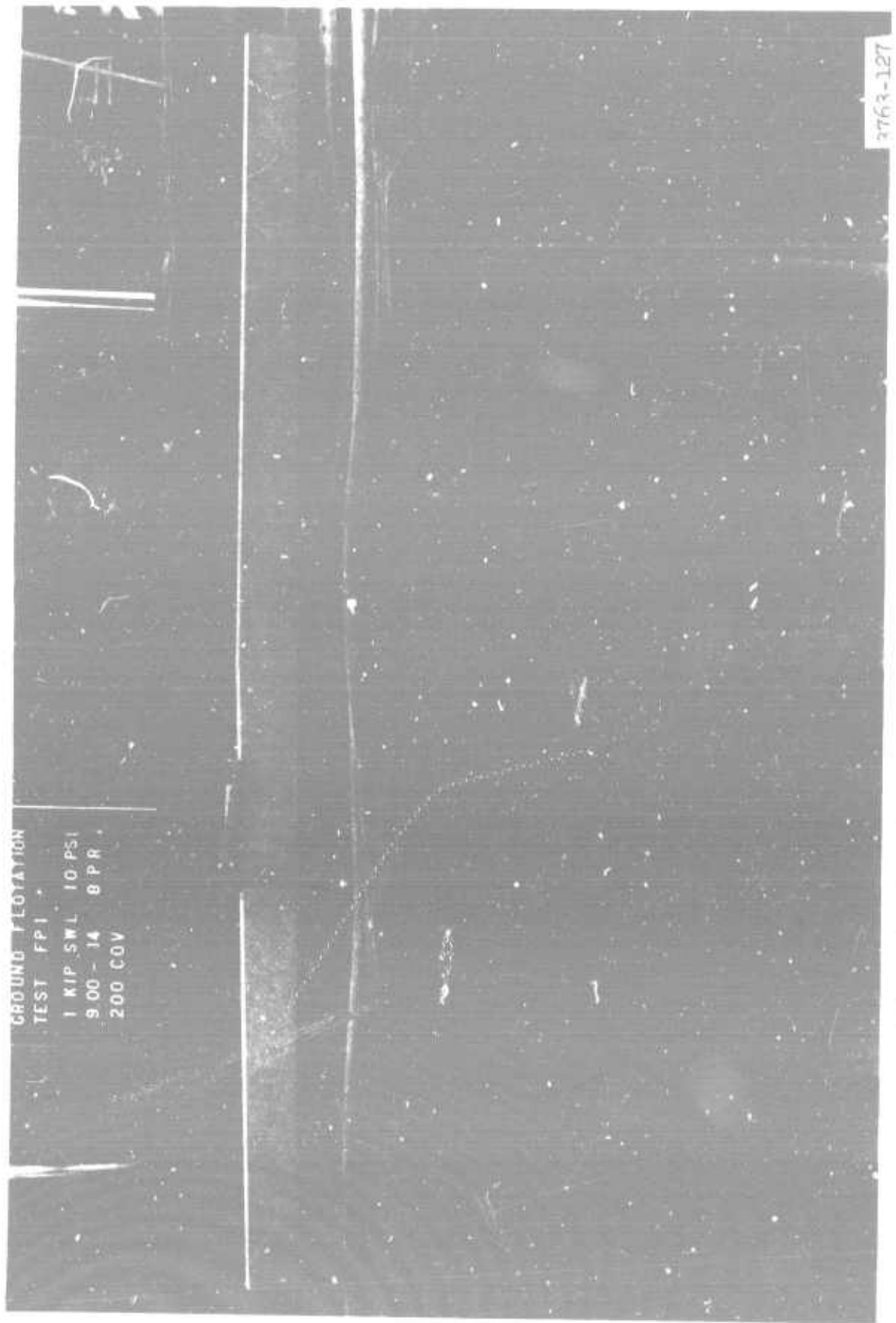


Figure 8. Lane 1 at 200 averages showing undulating profile

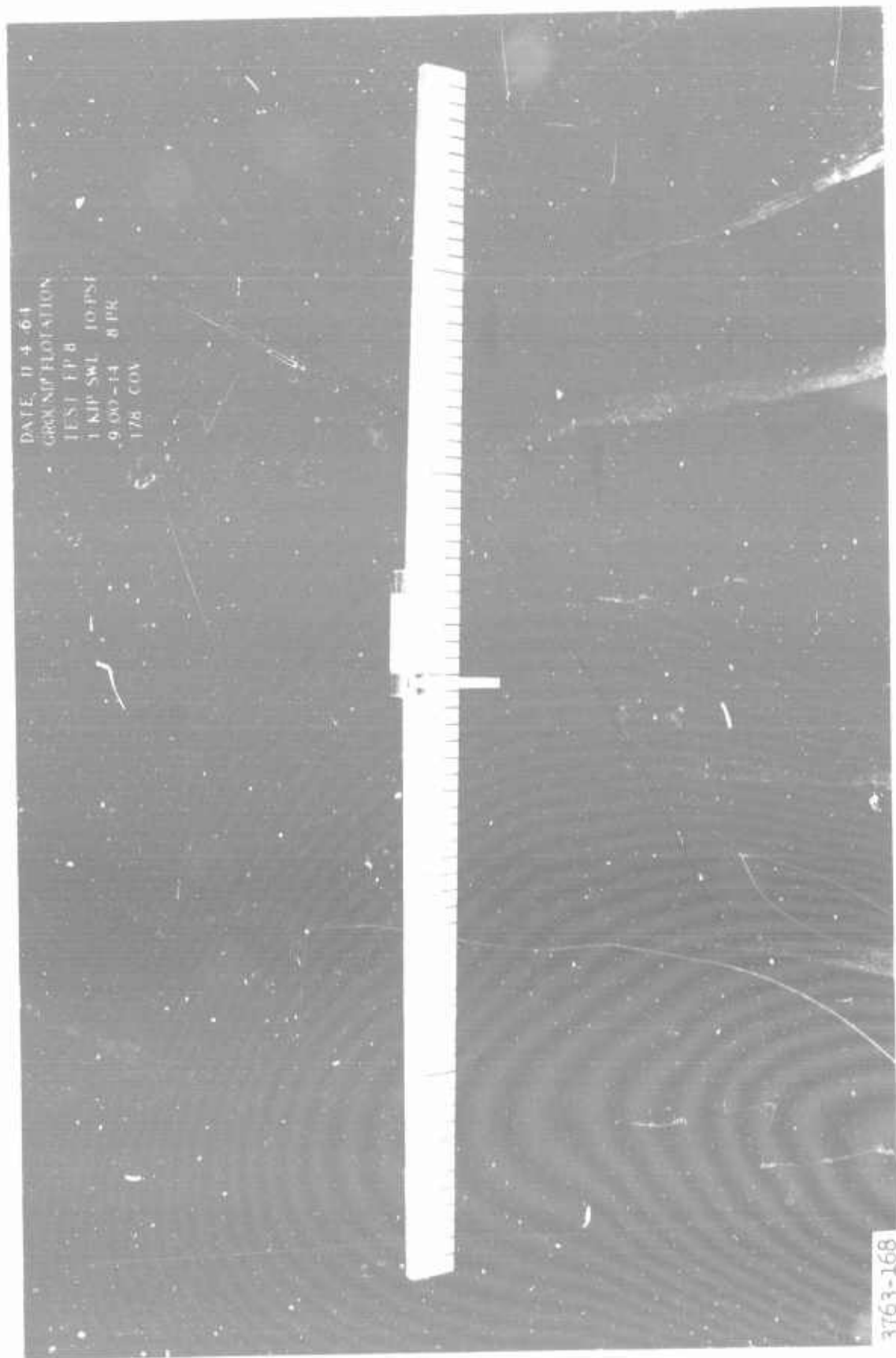


Figure 9. Lane 8 at 178 coverages (failure)



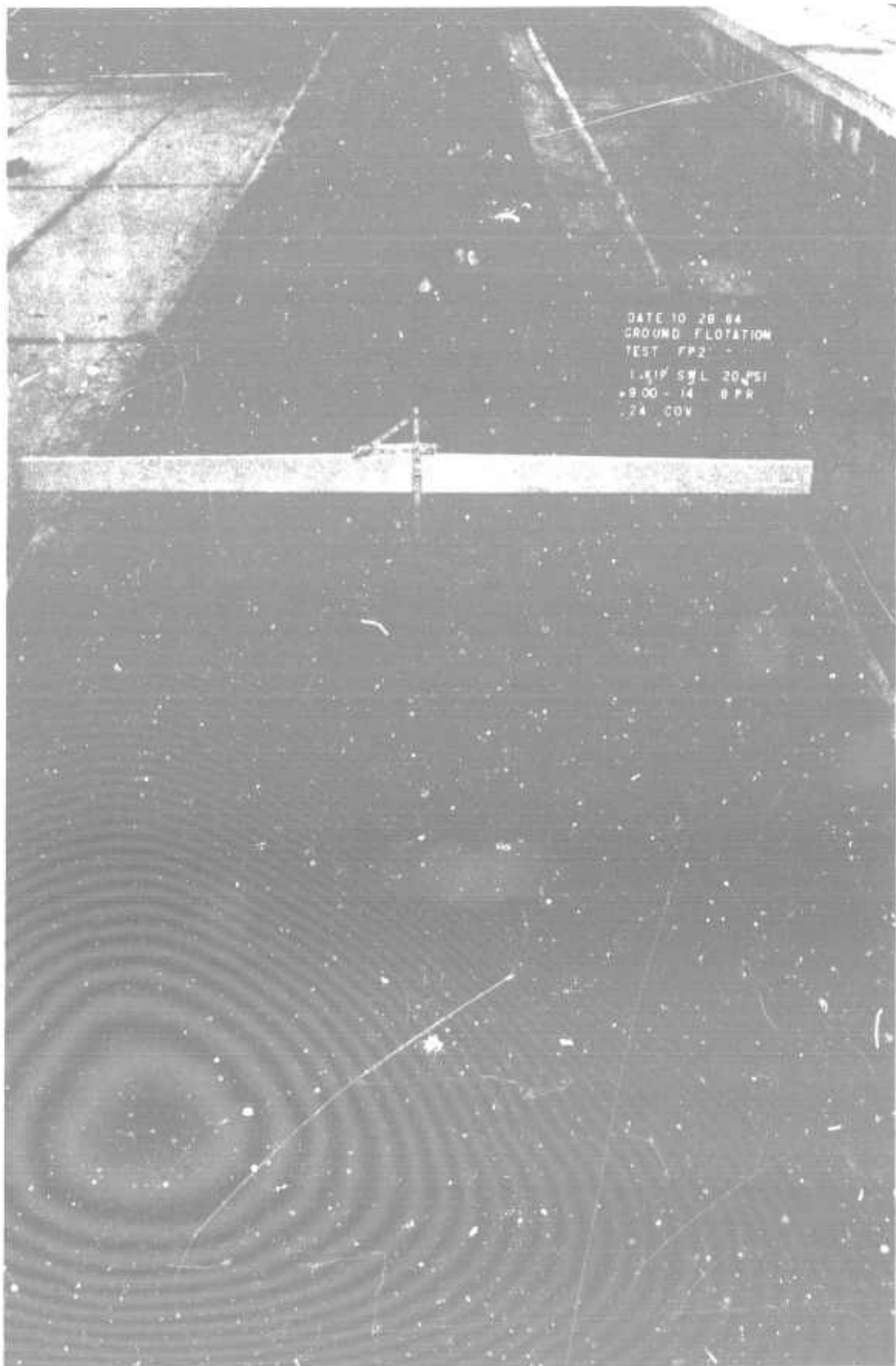


Figure 10. Lane 2 at 24 coverages (failure)

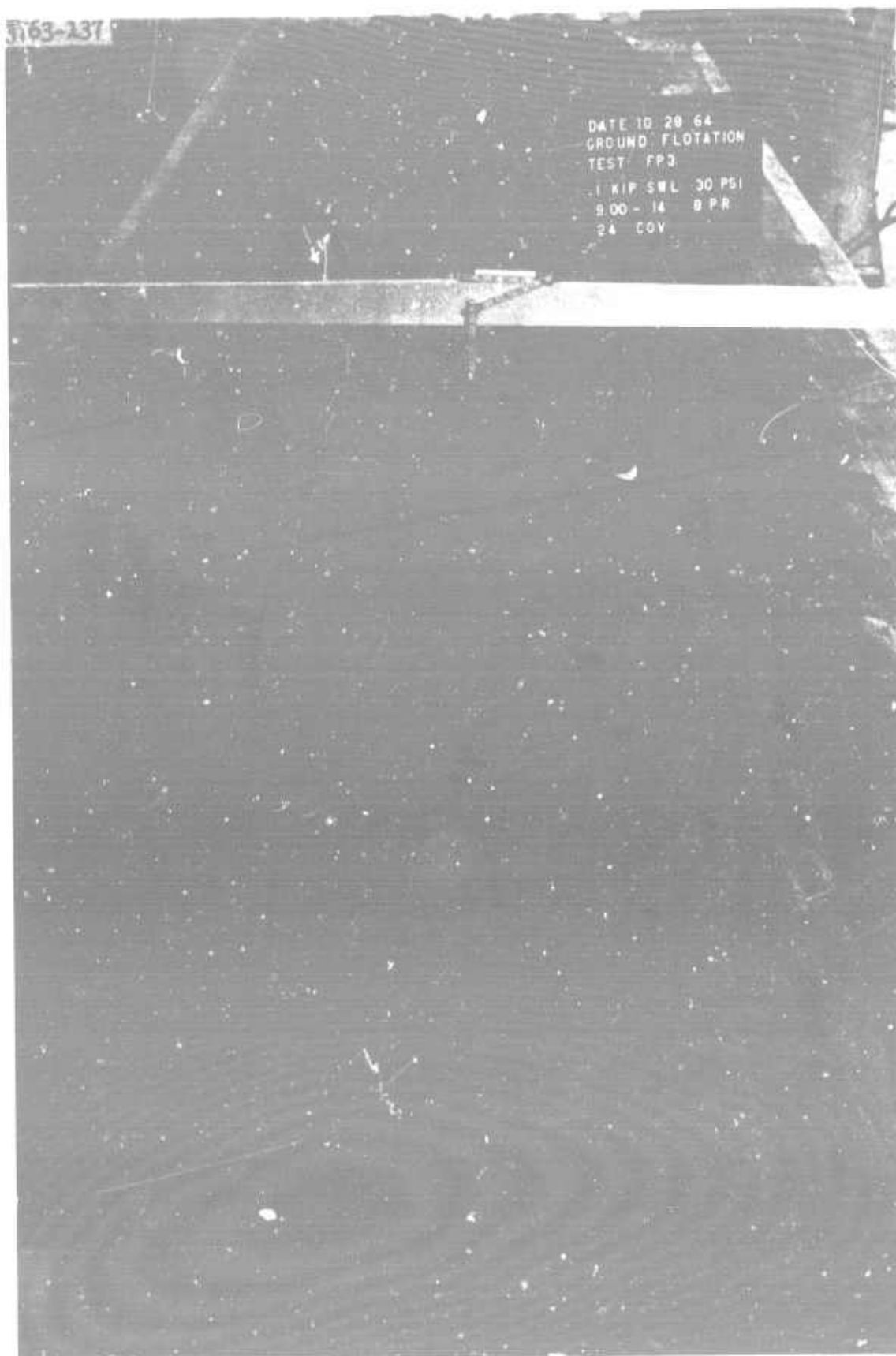


Figure 11. Lane 3 at 24 coverages (six postfailure coverages)

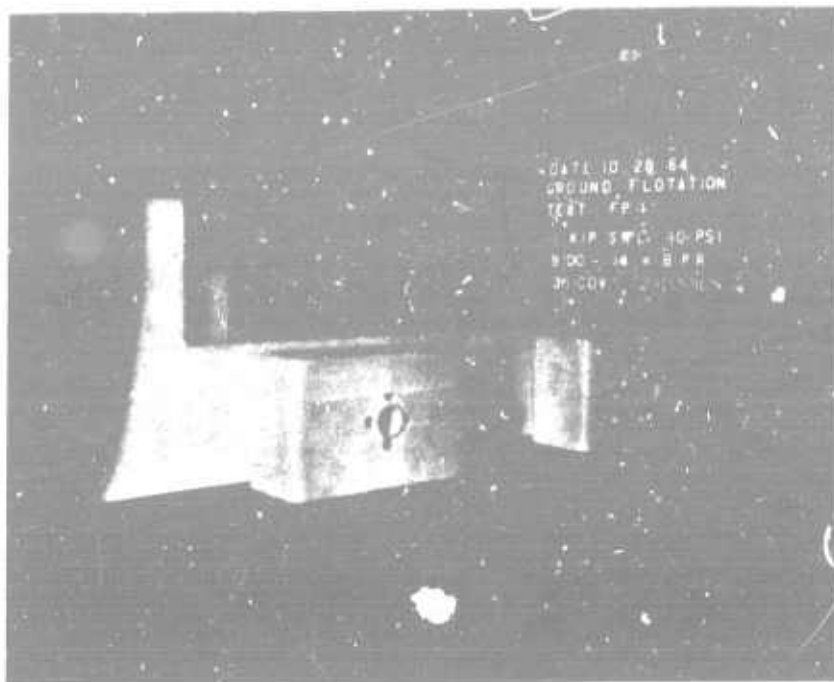


Figure 12. Load wheel showing soil accumulation

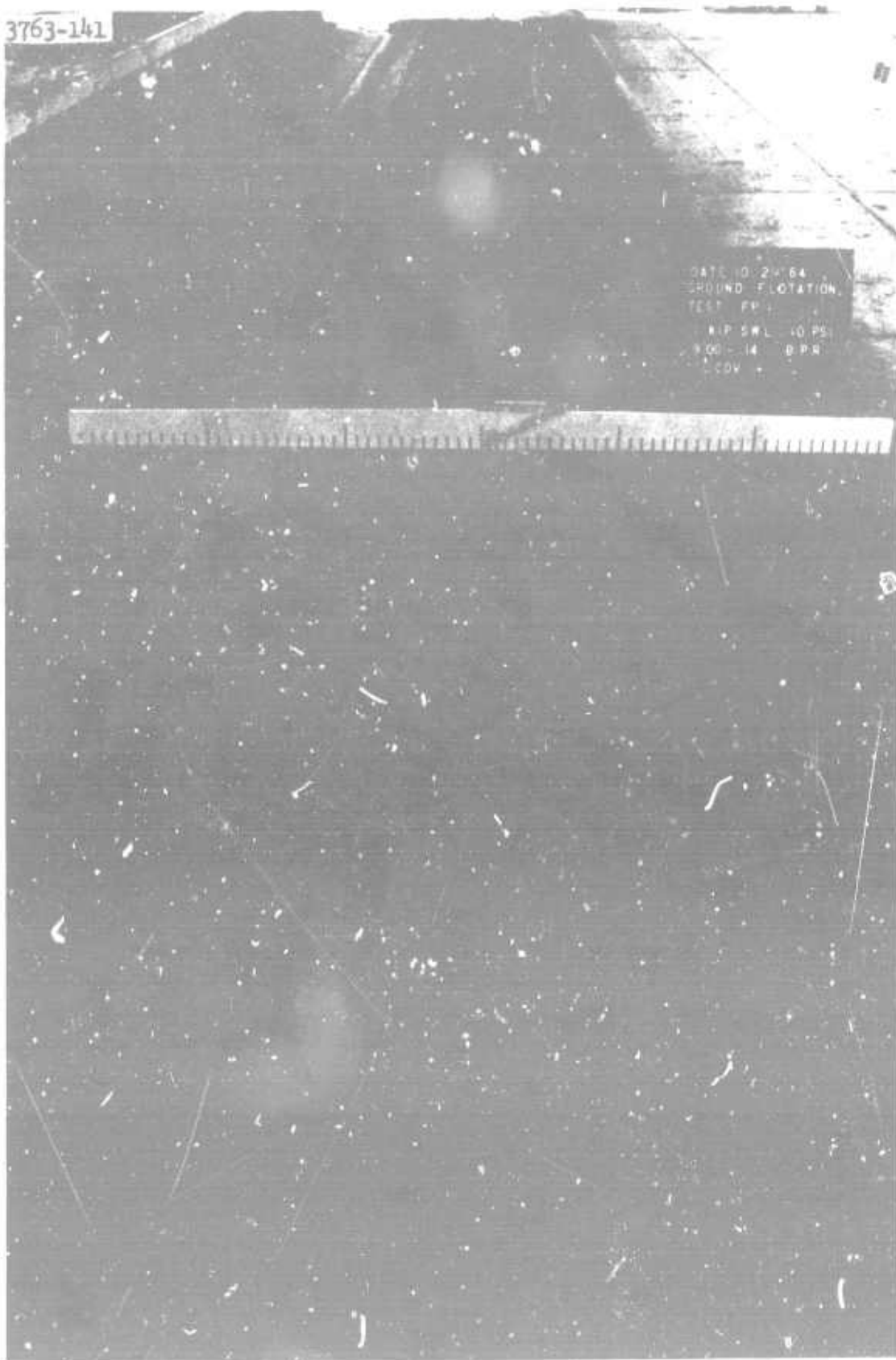


Figure 13. Lane 4 at 52 coverages (two postfailure coverages)

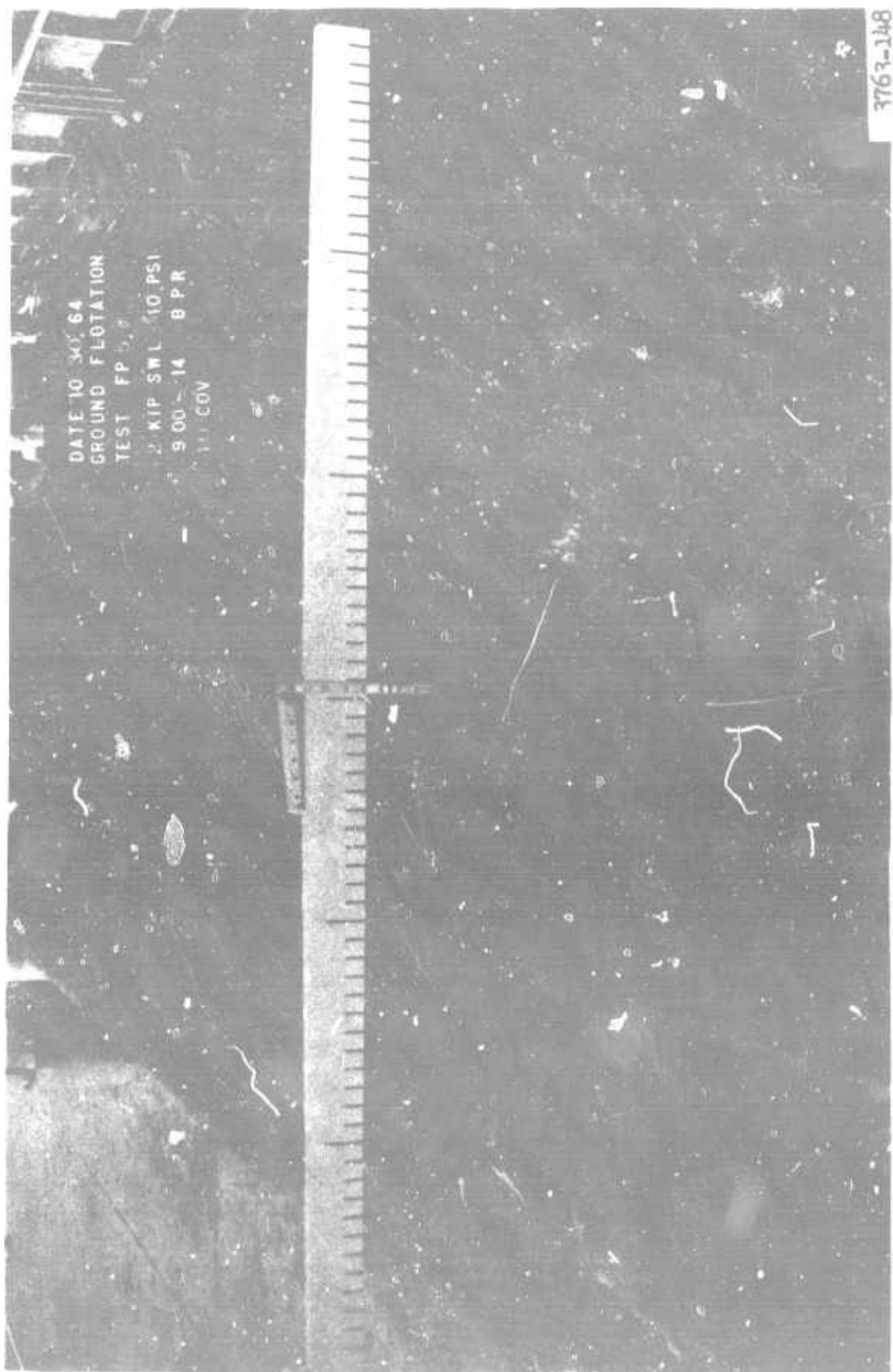


Figure 14. Ler 5 at 40 coverages (two postfailure coverages)



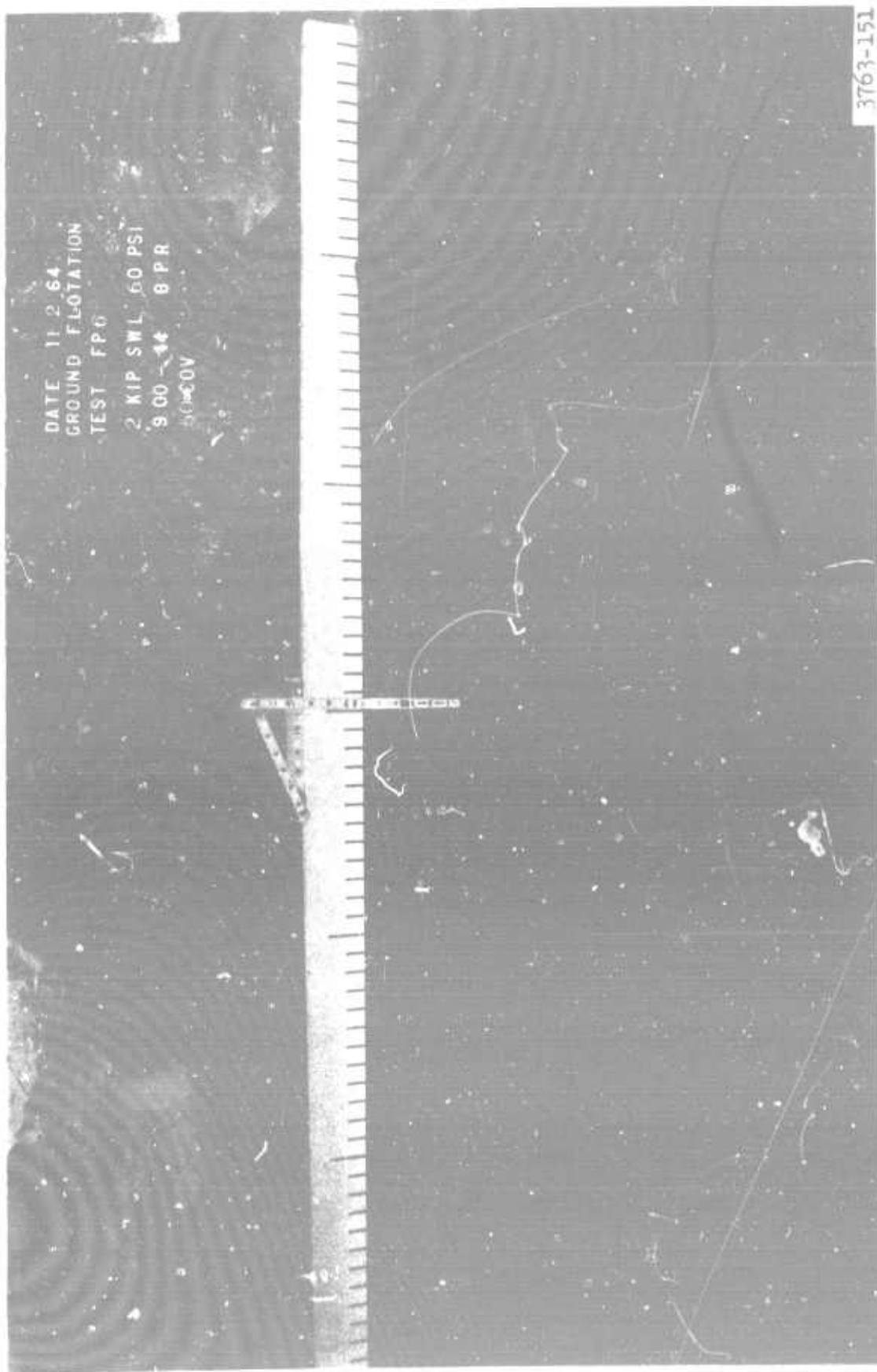


Figure 15. Lane 6 at 50 coverages (failure)

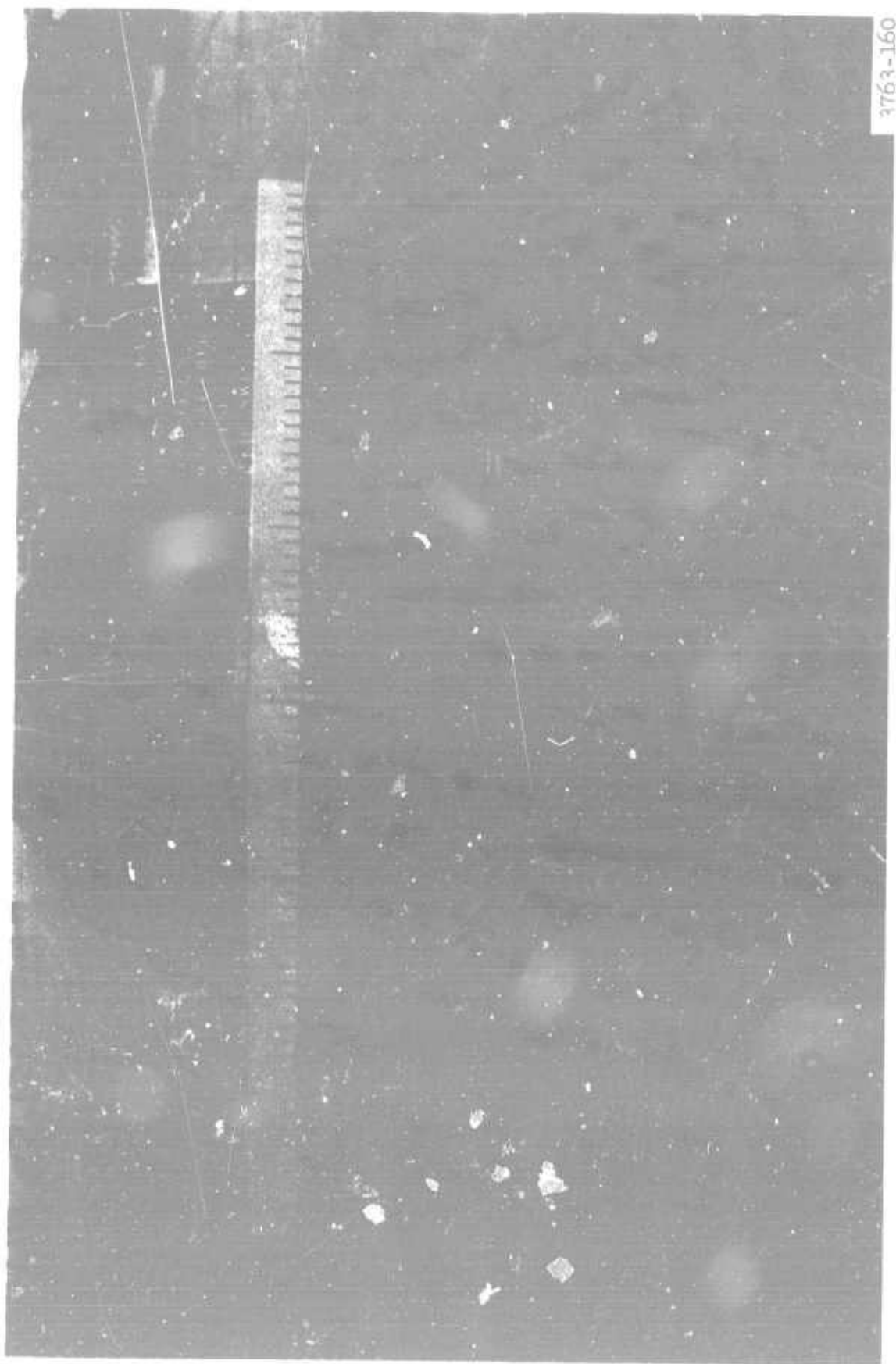
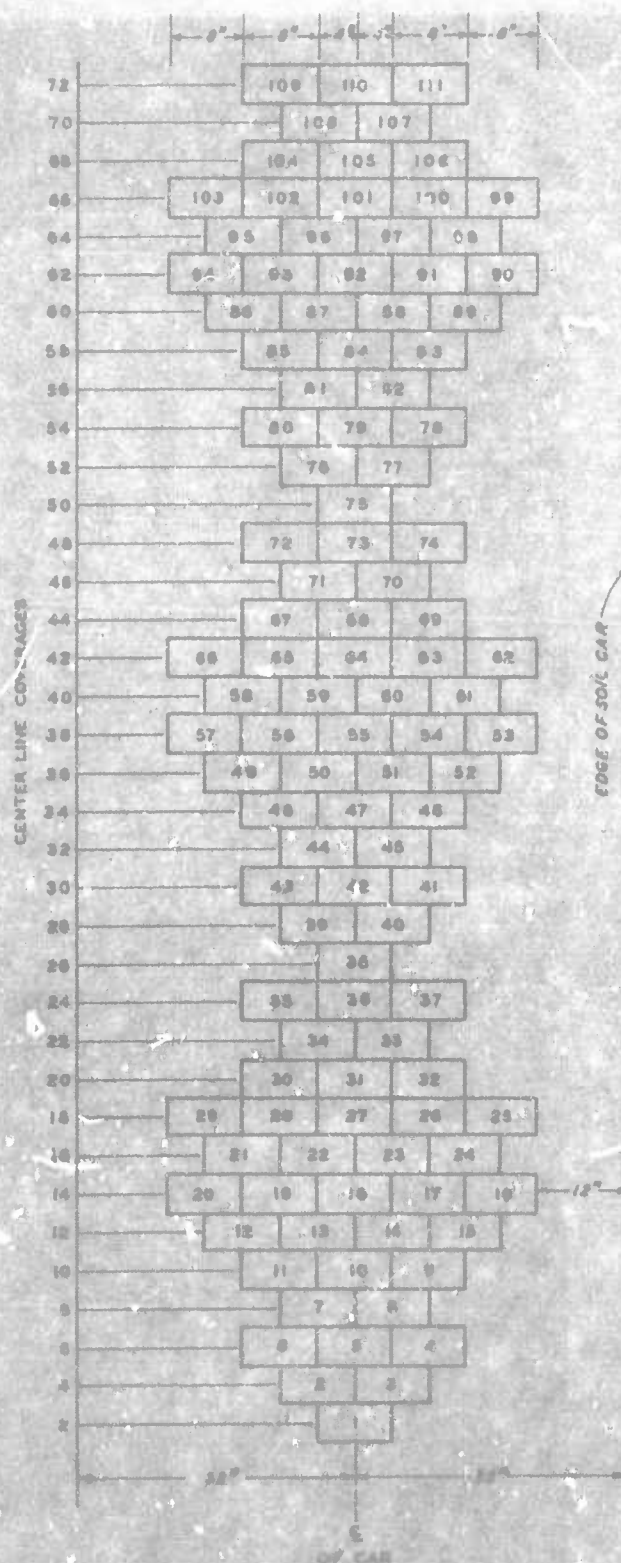


Figure 16. Lane 7 at 44 coverages (failure)



NOTE: RECTANGLES REPRESENT TIRE TRACKS. NUMBERS WITHIN RECTANGLES SHOW SEQUENCE OF APPLICATION.

TRAFFIC PATTERN

Figure 17

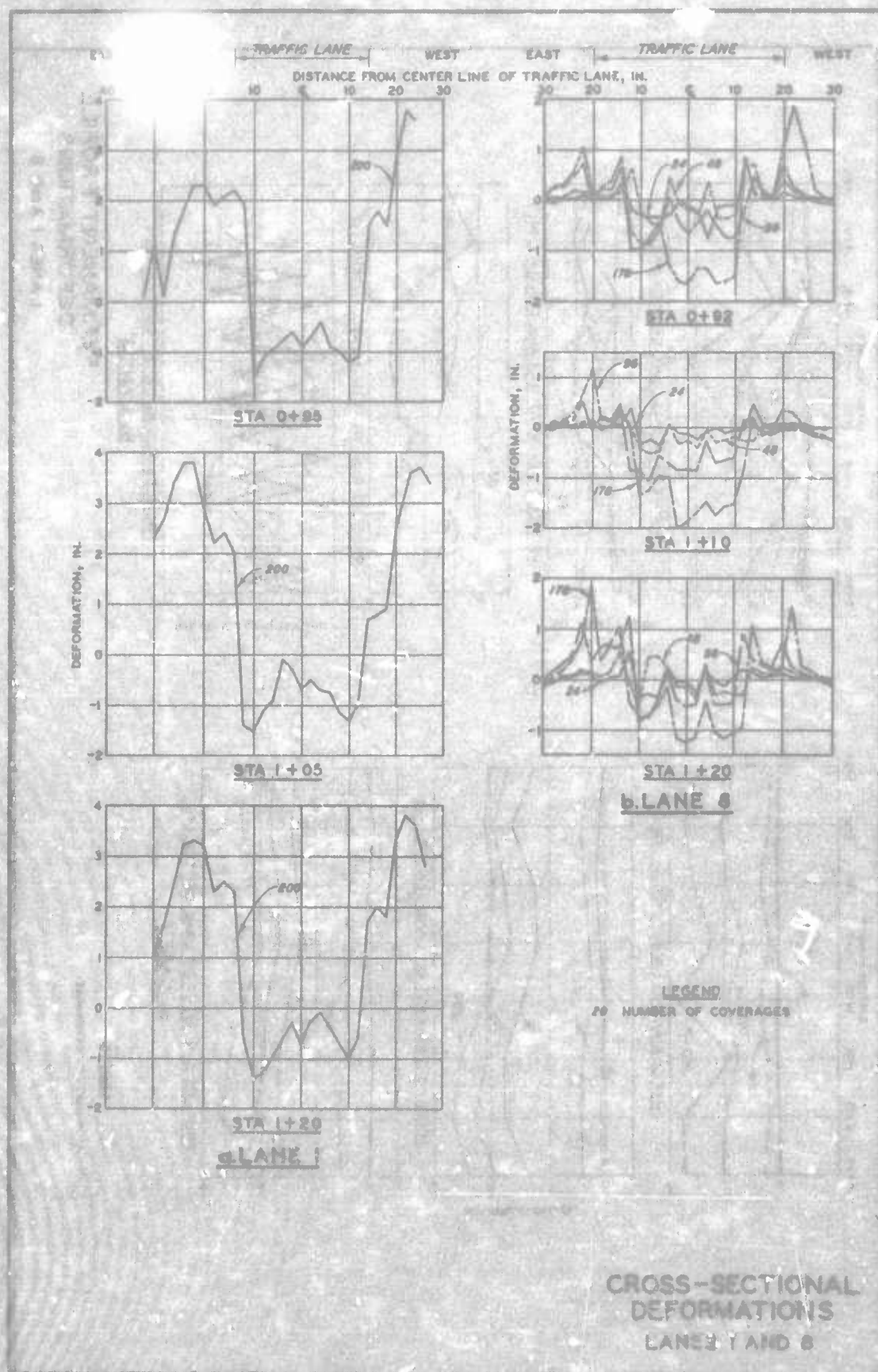


Figure 13



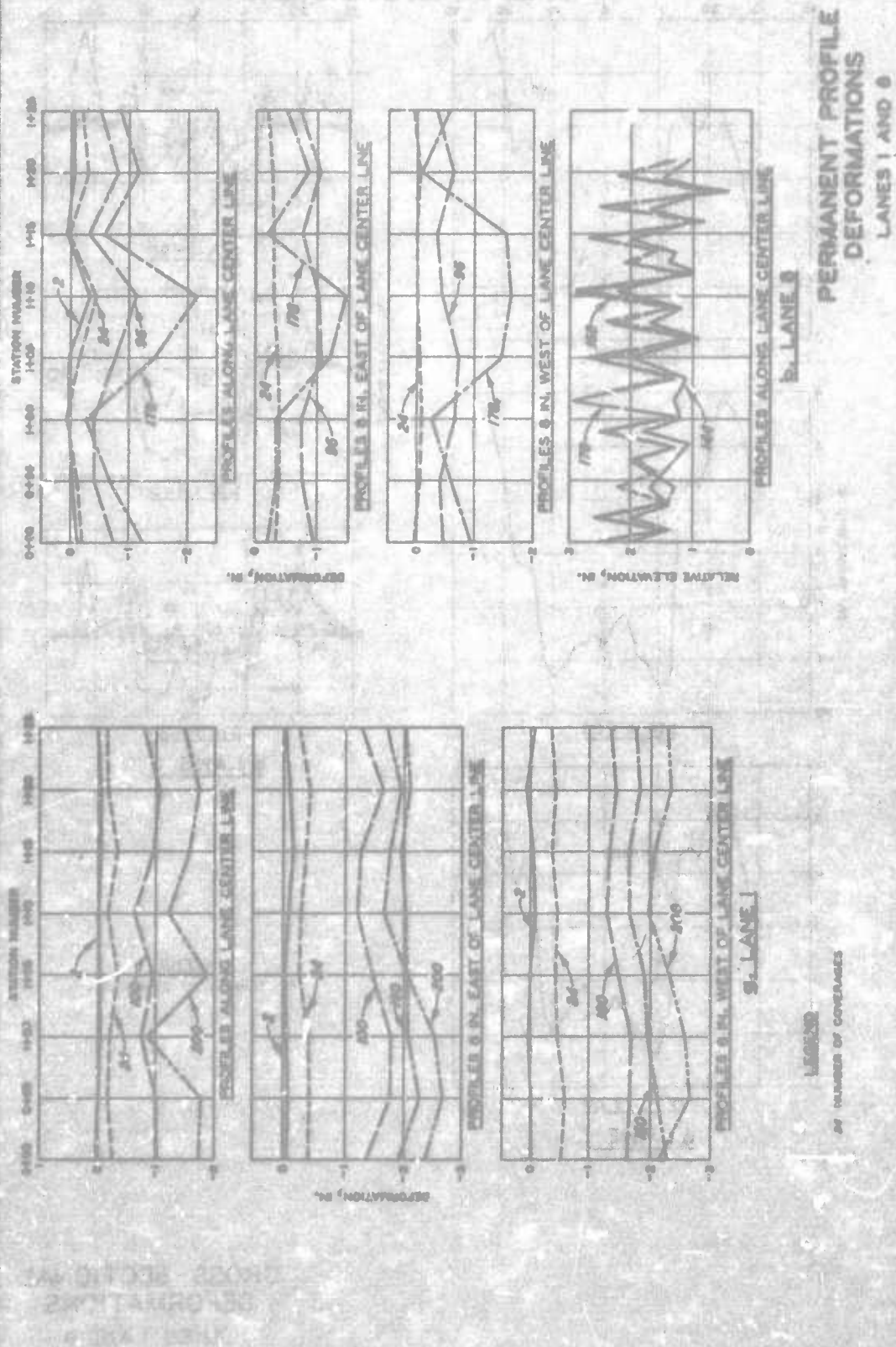
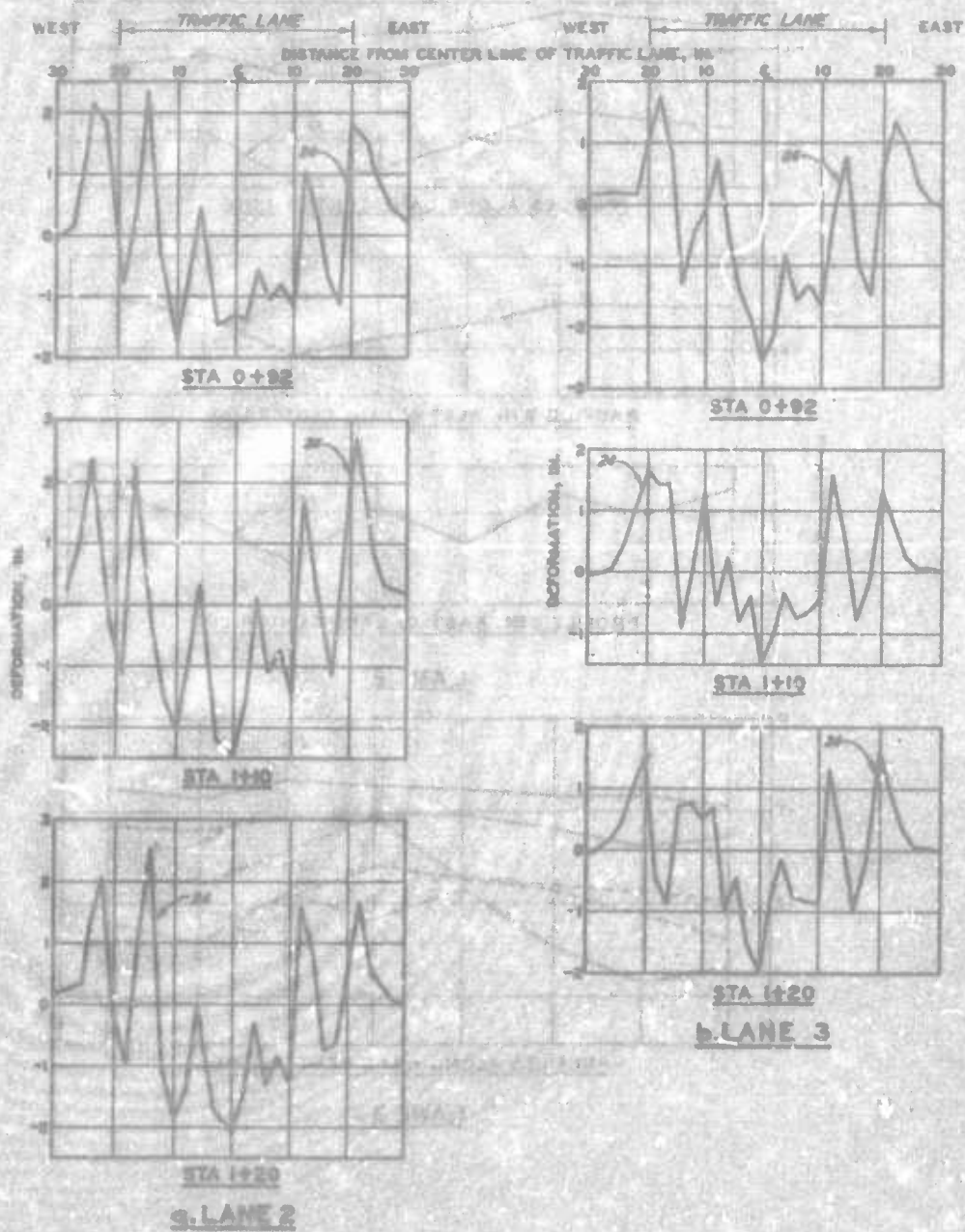


Figure 19

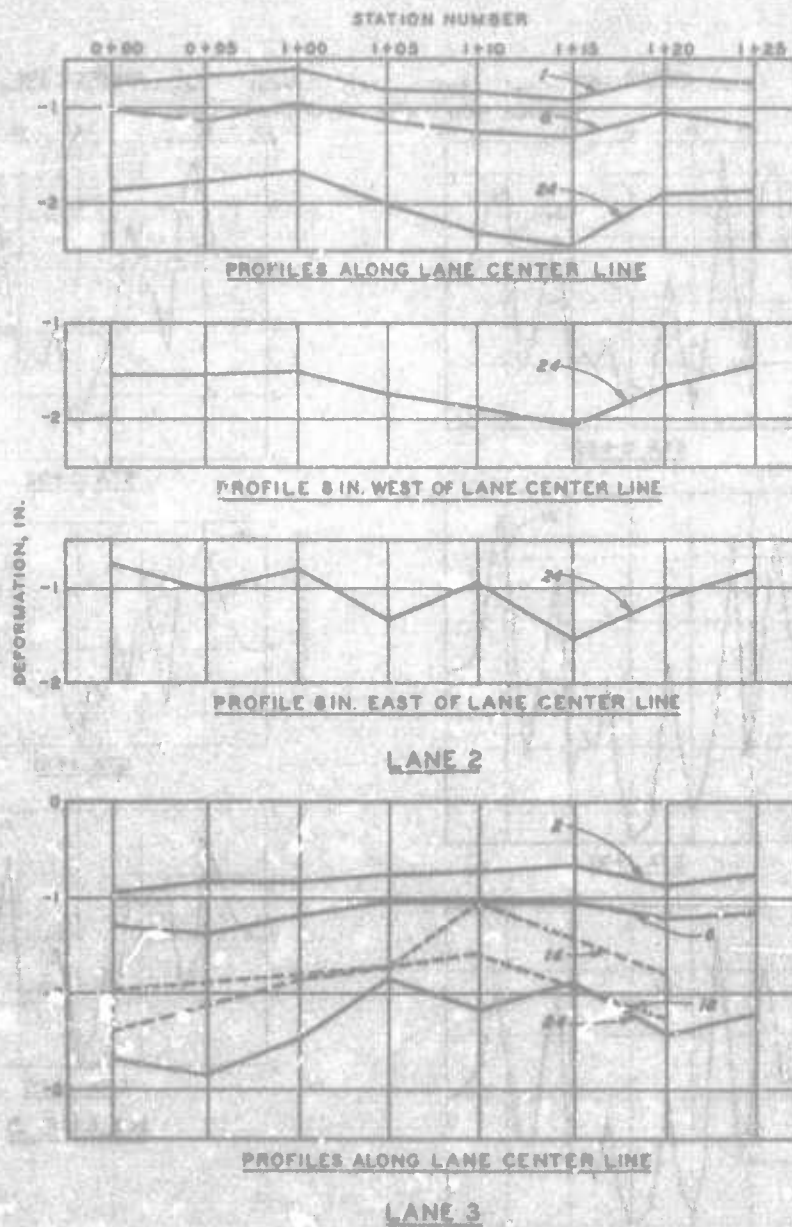


LEGEND

IN INCHES OF COVERAGES

CROSS-SECTIONAL  
DEFORMATIONS  
LANES 2 AND 3

Figure 20



**LEGEND**

24 NUMBER OF COVERAGES  
 -- PARTIAL DATA TAKEN AS  
 SPOT CHECK

**PERMANENT PROFILE  
 DEFORMATIONS  
 LANES 2 AND 3**

Figure 21



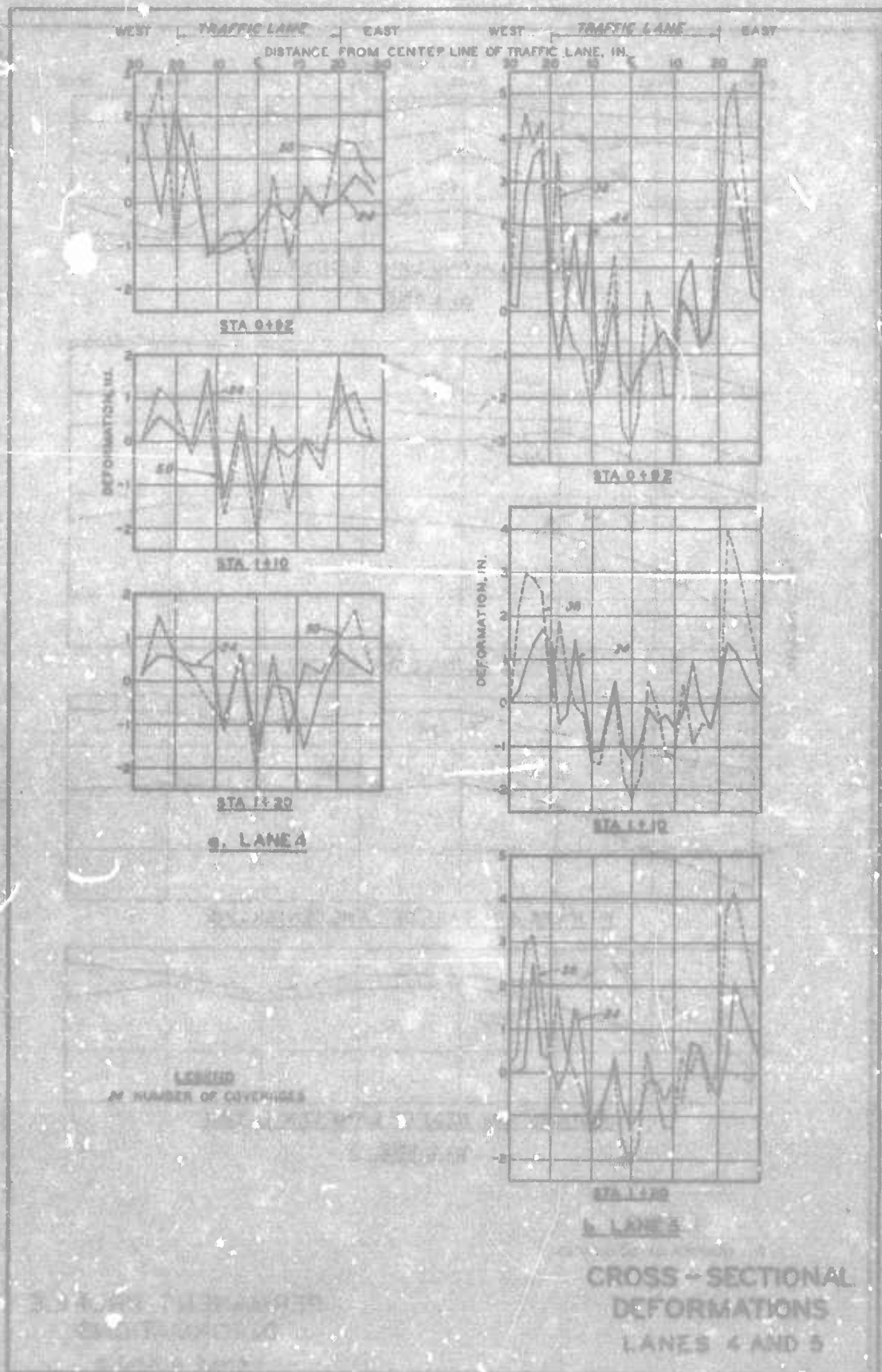
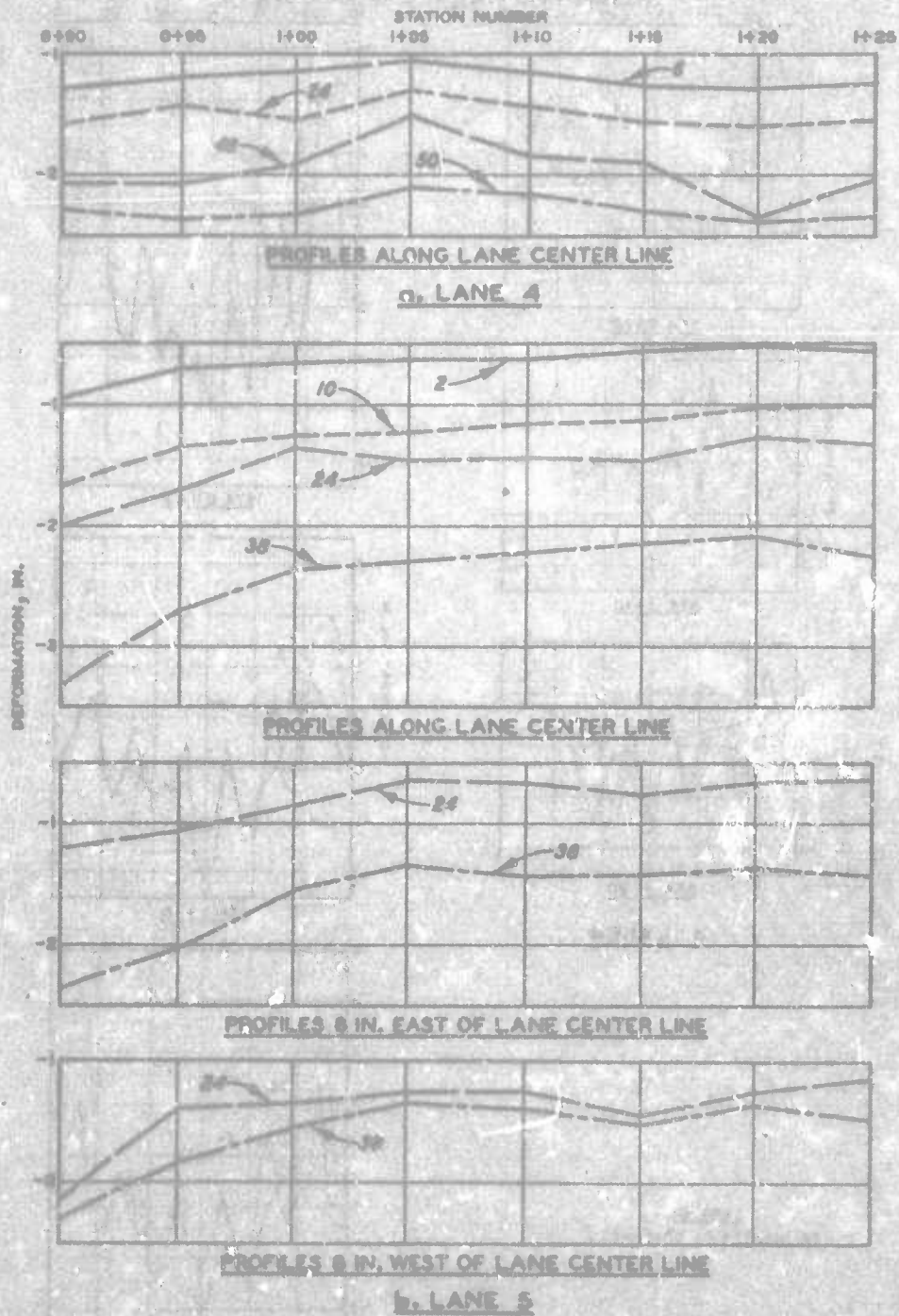


Figure 22



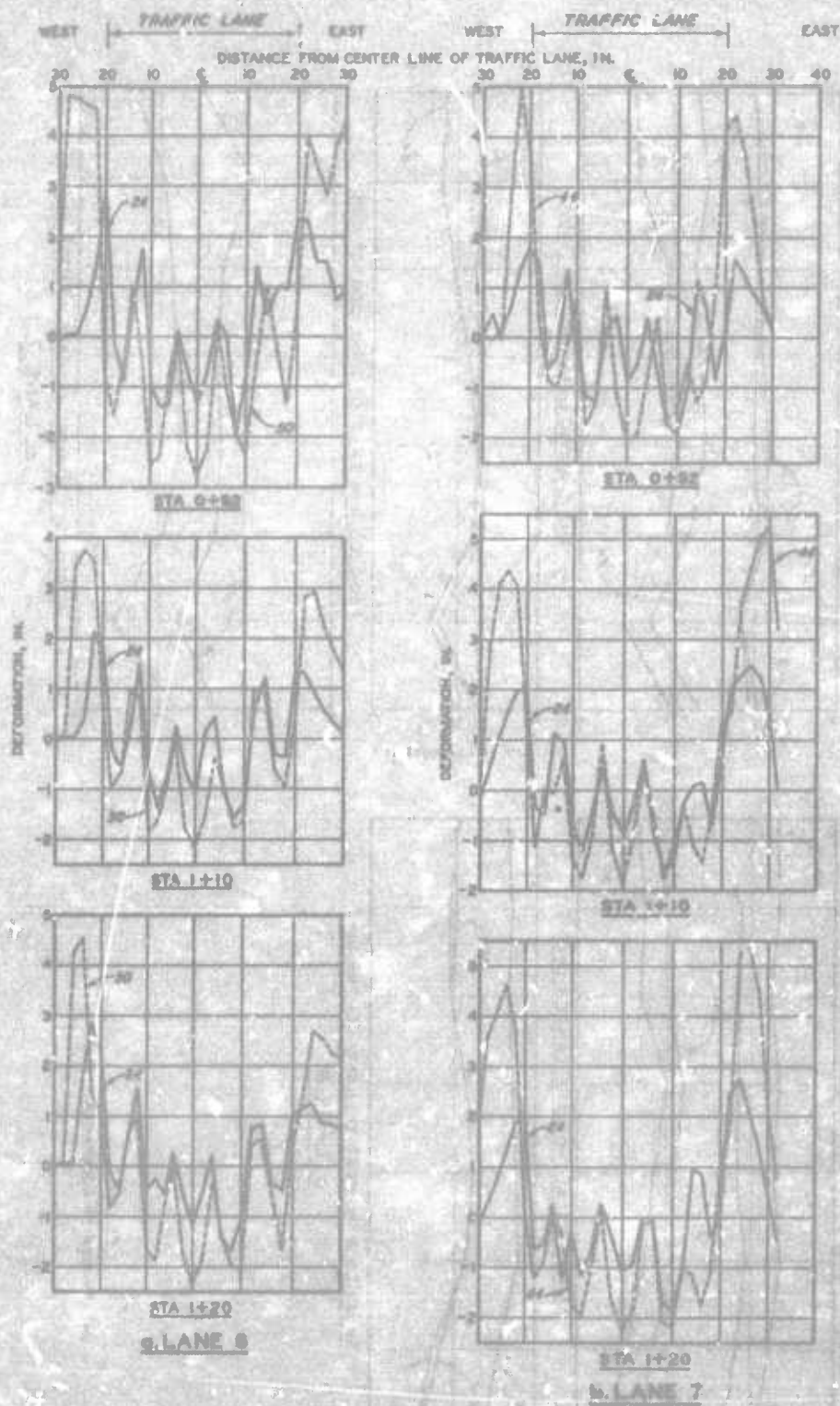
**LEGEND**

24 NUMBER OF COVERAGES

PERMANENT PROFILE  
DEFORMATIONS  
LANES 4 AND 5

Figure 23





CROSS-SECTIONAL  
DEFORMATIONS  
LANES 6 AND 7

FIGURE 24

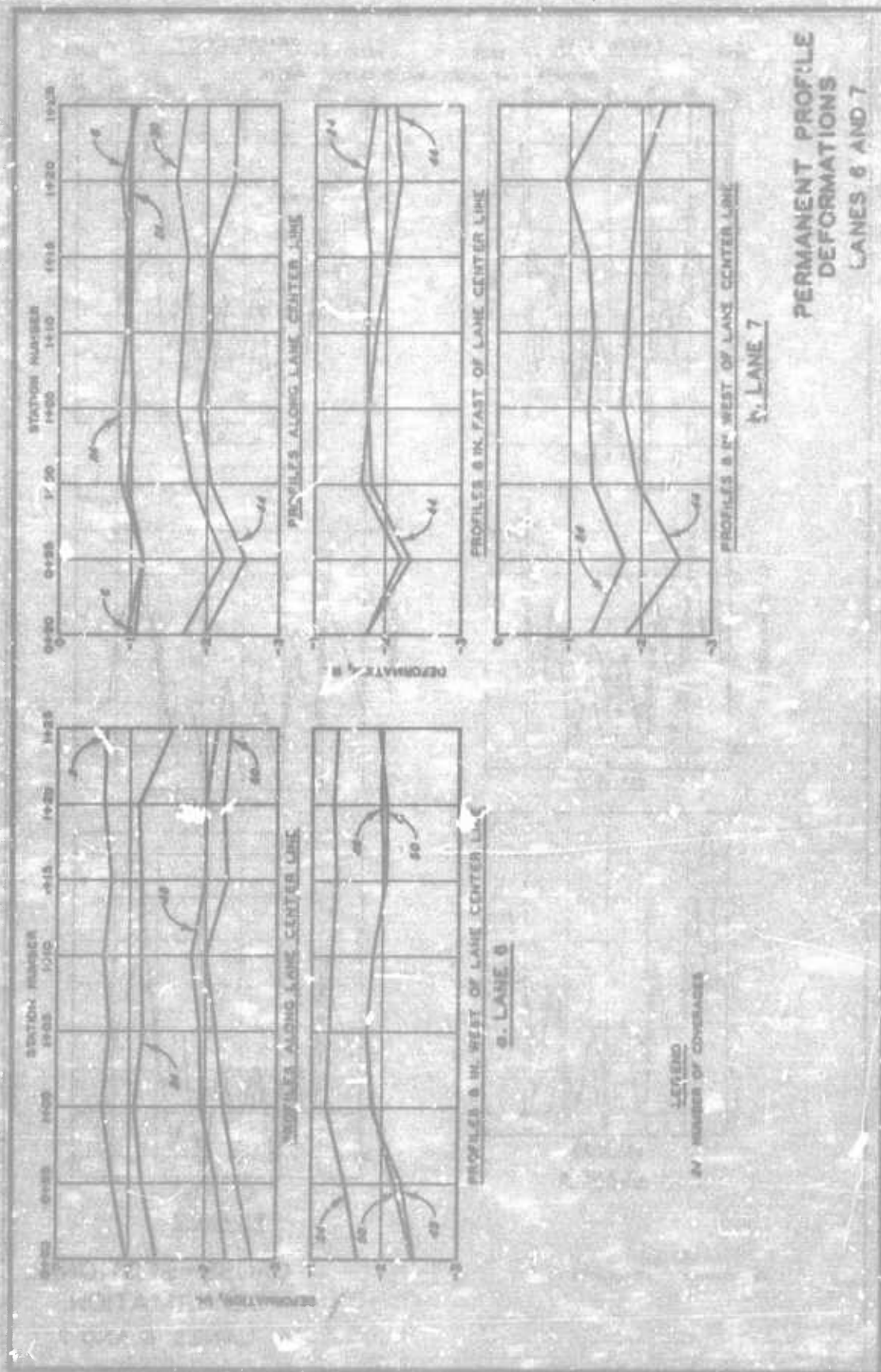


Figure 25

UNCLASSIFIED  
Security Classification

DOCUMENT CONTROL DATA - R&D

(Security classification of title, body of abstract and indexing annotation must be entered when the overall report is classified)

1. ORIGINATING ACTIVITY (Corporate source) U. S. Army Engineer Waterways Experiment Station		2a. REPORT SECURITY CLASSIFICATION UNCLASSIFIED	
		2b. GROUP	
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11. SUPPLEMENTARY NOTES		12. SPONSORING MILITARY ACTIVITY Air Force Flight Dynamics Laboratory Research and Technology Division AF Systems Command, WPAFB, Ohio	
13. ABSTRACT  This data report describes the results of work undertaken as part of an overall program to develop ground-flotation criteria for the C-5A aircraft.			

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14 KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
<b>Aircraft Ground Flotation</b> <b>Rolling Resistance</b> <b>Rear Area Airfields</b> <b>Support Area Airfields</b> <b>Forward Area Airfields</b> <b>Vehicle Mobility</b>						

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